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EXAMINER
WILSON, ROBERT W

ART UNIT	PAPER NUMBER
2475	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/975,518	KAPOOR ET AL.	
	Examiner	Art Unit	
	ROBERT W. WILSON	2475	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6, 29-35,38-41,43 and 44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-6* is/are allowed.

6)☒ Claim(s) *29-35,38-41,43 and 44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj (U.S. Patent No.: 5,345,599) in view of Shattil (U.S. Patent No.: 6,008,760)

Referring to claim 38, Paulraj teaches: signal receiver (Figure 5 or receiver using spatial filter 88 which is shown in more detail in Figure 6) the receiver comprising:

An adaptive array configured to receive signals from remote units (m sub-arrays 72, 74 ,& 76 make up the adaptive array which receive signal from Transmitters or remote units per Fig 5 and per col. 7 line 49 to col. 8 line 49)

A plurality of demodulator units configured to process the signals (There are d demodulators 98 configured to process the signals per Fig 5 and Fig 6 and per col. 7 line 49 to col. 8 line 49)

A plurality of beam formers configured to construct a desired signal response (There are D of the combination of weighting and summing or D beam formers per Fig 6 and per col. 7 line 49 to col. 8 line 49)

A spatial diversity combiner configured to remove interferences from said signal (combiner 98 per Fig 5 inherently remove interference by combining signals per col. 7 line 49 to col. 8 line 49)

Paulraj does not expressly call for: response as a function of direction of arrival data of the signals the desired signal response pattern providing a higher relative gain in one or more angular direction that minimizing co-channel interference in other angular directions

Shattil teaches: response as a function of direction of arrival data of the signals the desired signal response pattern providing a higher relative gain in one or more angular direction that minimizing co-channel interference in other angular directions
(The processor per Fig 1 inserts delays and sums the output signal response in order to form beam patterns by steering to angles theta1 and theta2 shown in Fig 1 per col. 4 line 14 to col. 6 line 60. Specifically beam steering results in adjusting the spatial gain or desired signal response

in angular direction and determining co-channel interference distribution on beam basis and subtracting the co-channel interference per col. 2 lines 38 to 60)

It would have been obvious to one of ordinary skill in the art at the time of the invention to add response as a function of direction of arrival data of the signals the desired signal response pattern providing a higher relative gain in one or more angular direction that minimizing co-channel interference in other angular directions of Shattil to the processing of Paulraj in order to improve the spatial processing which will result in improved spatial interference processing.

3. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj (U.S.

Patent No.: 5,345,599) in view of Shattil (U.S. Patent No.: 6,008,760) further in view of Forssen

(U.S. Patent No.: 5,566,209)

Referring to claim 39, the combination of Paulraj and Shattil teach the receiver of claim 38

The combination of Paulraj and Shatill do not expressly call for: direction of arrival processor configured to calculate a direction of arrival for the signals

Forssen teaches: direction of arrival processor configured to calculate a direction of arrival for the signals (18 per Fig 2 and per col. 4 lines 38 to 57 or direction of arrival processor)

It would have been obvious to one of ordinary skill in the art at the time of the invention to add direction of arrival processor configured to calculate a direction of arrival for the signals of Forssen to the processing of the combination Paulraj and Shatill in order to improve the spatial processing which will result in improved spatial interference processing.

4. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj (U.S.

Patent No.: 5,345,599) in view of Forssen (U.S. Patent No.: 5,566,209) further in view of

Alamouti (U.S. Patent No.: 5,933,421)

Referring to claim 40, the combination of Paulraj and Forssen teach: the receiver of claim 38 and and further comprising segmenting available bandwidth into a plurality of frequency bins (segmenting same channel which has a number of frequencies or bins for d signals per col. 7 lines 49 to 52)

The combination of Paulraj and Forseen do not expressly call for: OFDM

Alamouti teaches: OFDM (col. 2 line 65 to col. 3 line 230

It would have been obvious to add OFDM of Almouti in place of the signal of the combination of Paulraj and Forssen (FM per col. 1 line 26 of Paulraj) in order to provide more capacity through the subchannels of OFDM.

Allowable Subject Matter

5. Claims 1-6 are allowed. The following is an Examiner's statement of reasons for allowance: Claims 1-6 are considered allowable since no prior art reference or combination of prior art references alone or in combination disclose or suggest the combination of limitations specified in the independent claims including:
"at least two receiving elements configured to receive the communication signal on a same frequency band during any period of time" in combination with other claim limitations as specified in claim 1.

Claim Rejections - 35 USC § 112

6. Claims 29-35, 38-41, & 43-44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Referring to claim 29, claim 29 is indefinite because the claim fails to define relationship between the structure of the receiver and transmitter at the primary site and the structure of the antenna array including the multiple receiving elements also at the final site.

Referring to claim 35, claim 35 is indefinite because the claim inconsistently utilizes antecedent basis. Specifically is "adaptive antenna array architecture" the same or different from "the architecture"?

Referring to claim 38, claim 38 is indefinite because inconsistent usage of antecedent basis. Applicant inconsistent utilizes antecedent basis when claiming "signal" with regard to "adaptive array" , "demodulator units", "beamformers", and "spatial diversity combiner". Specifically the examiner cannot ascertain whether "signal" is initial signal received at into adaptive array or out of the adaptive array, or into the demodulator, or out of the demodulator. Also it is unclear whether "signal receiver" and "the receiver" are the same or different.

Referring to claim 41, claim 41 is indefinite because the meaning of the claim is incomprehensible even after reading the specification Pgs 38-44 which is where the claimed invention appears to be described. Applicant is entitled to be their own lexicographer; however, the applicant has the burden to define terms in the specification which allows the metes and bound of the claim to be understood in the event that applicant definitions differs from the terms used by one of ordinary skill in the art. One of ordinary skill in the art normally interprets a bin virtual band of frequencies which are related to the no of points in an FFT divide by the highest

frequency sampled. The 3 db width of the bin in related to the shading or weight of the data before the FFT is applied. As a result each bin has the same width so there are no widely spaced frequency bins in this definition. In claim 41 antecedent basis is not consistently utilized so the examiner does not know whether "at least one widely spaced frequency bin" is the same or different from "the at least one frequency bin". The claim is indefinite because the claim lacks a step which defines how all of the other steps can be related together via a final post processing step. Finally the details defined in the three steps of "assigning, spacing, and locating" are written with terms that are different from those used by one of ordinary skill in the art that the meaning of the processing is incomprehensible.

Referring to claim 43, claim 43 is indefinite because the meaning of the claim is incomprehensible even after reading the specification Pgs 38-44 which is where the claimed invention appears to be described. Applicant is entitled to be their own lexicographer; however, the applicant has the burden to define terms in the specification which allows the metes and bound of the claim to be understood in the event that applicant definitions differs from the terms used by one of ordinary skill in the art. One of ordinary skill in the art normally interprets a bin virtual band of frequencies which are related to the no of points in an FFT divide by the highest frequency sampled. The 3 db width of the bin in related to the shading or weight of the data before the FFT is applied. As a result each bin has the same width so there are no widely spaced frequency bins in this definition. In claim 43 antecedent basis is not consistently utilized so the examiner does not know whether “signal arrival” is the same or different. The claim is indefinite because the claim lacks a step which defines how all of the other steps can be related together via a final post processing step. Finally the details defined in the three steps of "determining, assigning, and assigning" are written with terms that are different from those used by one of ordinary skill in the art that the meaning of the processing is incomprehensible.

Referring to claim 44, claim 44 is indefinite because the meaning of the claim is incomprehensible even after reading the specification Pgs 38-44 which is where the claimed invention appears to be described. Applicant is entitled to be their own lexicographer; however, the applicant has the burden to define terms in the specification which allows the metes and bound of the claim to be understood in the event that applicant definitions differs from the terms used by one of ordinary skill in the art. One of ordinary skill in the art normally interprets a bin virtual band of frequencies which are related to the no of points in an FFT divide by the highest frequency sampled. The 3 db width of the bin in related to the shading or weight of the data before the FFT is applied. As a result each bin has the same width so there are no widely spaced frequency bins in this definition. In claim 44 antecedent basis is not consistently utilized so the examiner does not know whether “widely space bin” is the same or different “the bin”. The claim is indefinite because the claim lacks a step which defines how all of the other steps can be related together via a final post processing step. Finally the details defined in the three steps of "partitioning, assigning, and distributing" are written with terms that are different from those used by one of ordinary skill in the art that the meaning of the processing is incomprehensible.

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 41, 43, & 44 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Referring to claim 41, claim 41 is directed to a method … "in a communication system". "in a communication system" is in the preamble which reflects an intended use and is not a positive claim recitation; therefore,, the claim language does not require that the method be implemented by a particular machine; consequently, this claim is non-statutory.

Referring to claim 43, claim 43 is directed to a method is directed to a method … "in a communication system". "in a communication system" is in the preamble which reflects an intended use and is not a positive claim recitation; therefore,, the claim language does not require that the method be implemented by a particular machine; consequently, this claim is non-statutory.

Referring to claim 44, claim 44 is directed to a method is directed to a method … "in a communication system". "in a communication system" is in the preamble which reflects an intended use and is not a positive claim recitation; therefore,, the claim language does not require that the method be implemented by a particular machine; consequently, this claim is non-statutory.

Response to Amendment

9. Applicant's arguments with respect to claims 1-6, 29-35, 38-41, & 43-44 have been considered but are moot in view of the new ground(s) of rejection.

The examiner provides the following explanation in order to be totally responsive to applicant amendment.

The examiner respectfully disagrees with applicant argument that the 101 rejection has been traversed. Applicant has amend the claims 41, & 43-44 to have "in a communication system" in the preamble. Applicant know that the preamble reflects and intended use or optional claim

limitation; consequently, the claim still lacks machine or inherent machine to perform a significant step so the 101 rejection has not been overcome.

The examiner respectfully disagrees with applicant argument that the combination of references do not teach" a plurality of beamformers configured to construct a desired signal response pattern as a function of direction of arrival data of the signals, the desired signal response pattern providing a higher relative gain in one or more angular directions and minimizing co-channel interference in other angular directions.

Paulraj teaches: A plurality of beam formers configured to construct a desired signal response (There are D of the combination of weighting and summing or D beam formers per Fig 6 and per col. 7 line 49 to col. 8 line 49)

A spatial diversity combiner configured to remove interferences from said signal (combiner 98 per Fig 5 inherently remove interference by combining signals per col. 7 line 49 to col. 8 line 49)

Paulraj does not expressly call for: response as a function of direction of arrival data of the signals the desired signal response pattern providing a higher relative gain in one or more angular direction that minimizing co-channel interference in other angular directions

Shattil teaches: response as a function of direction of arrival data of the signals the desired signal response pattern providing a higher relative gain in one or more angular direction that minimizing co-channel interference in other angular directions (The processor per Fig 1 inserts delays and sums the output signal response in order to form beam patterns by steering to angles theta1 and theta2 shown in Fig 1 per col. 4 line 14 to col. 6 line 60. Specifically beam steering results in adjusting the spatial gain or desired signal response in angular direction and determining co-channel interference distribution on beam basis and subtracting the co-channel interference per col. 2 lines 38 to 60)

It would have been obvious to one of ordinary skill in the art at the time of the invention to add response as a function of direction of arrival data of the signals the desired signal response pattern providing a higher relative gain in one or more angular direction that minimizing co-channel interference in other angular directions of Shattil to the processing of Paulraj in order to improve the spatial processing which will result in improved spatial interference processing.

Applicant goes on to argue that neither Paulraj or Shanttil employs direction of arrival information to "construct a desired signal response matter" or "minimizing co-channel interference in other angular direction. First applicant claim does not state how direction of arrival or cochannel interference in other angular direction is performed. Clearly by controlling the radiation pattern based on relative positioning of the elements the result of direction of arrival information to "construct a desired signal response matter" or "minimizing co-channel interference in other angular direction is achieved.

The examiner respectfully disagrees with applicant's argument that Paulraj does not teach "combiner that constructs a desired signal response pattern."

The examiner points out that applicant has not claimed "combiner that constructs a desired signal response" so that argument is not relevant.

Clearly Paulraj teaches: A spatial diversity combiner configured to remove interferences from said signal (combiner 98 per Fig 5 inherently remove interference by combining signals per col. 7 line 49 to col. 8 line 49) which is the relevant claim limitation.

The examiner respectfully disagrees with the applicant argument that applicant has claimed "controlling a signal vs construction a desired signal having certain requirements" is not relevant because applicant has not defined this as a claim limitation.

The examiner respectfully disagrees with applicant argument that the other references used to reject claims 39 and 40 need to correct deficiencies of Paulraj and Shattil because there are no deficiencies.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT W. WILSON whose telephone number is (571)272-3075. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dang Ton can be reached on 571/272-3171. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert W Wilson/
Primary Examiner, Art Unit 2475

RWW
1/3/10